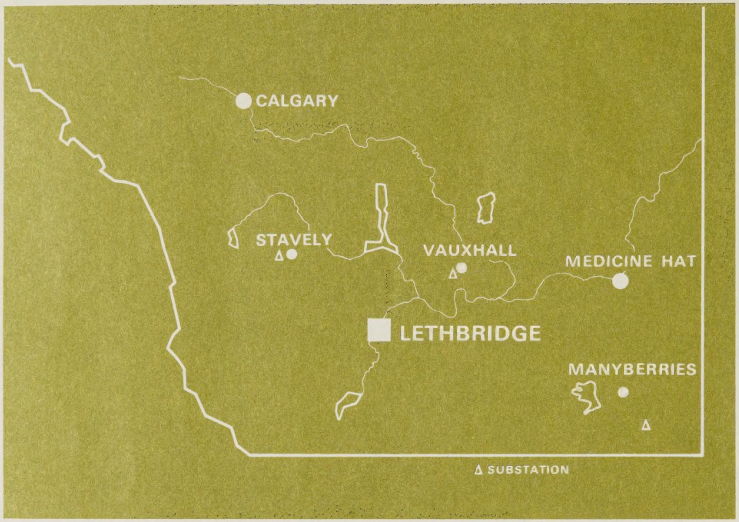
CANADA AGRICULTURE

LETHBRIDGE



Map of southern Alberta showing location of substations.

LETHBRIDGE RESEARCH STATION

The Lethbridge Research Station, located on the eastern boundary of the city on 1077 acres of land, serves an area of great ecological variability from extremely dry conditions in the southeastern section of the province to the more moist area of the foothills. Within the area are nearly a million acres of irrigated land. Warm chinook winds frequently desiccate crops and cause serious soil drifting but they also temper the climate so that many crops can be grown that otherwise would not survive the Canadian prairies. Diversification of crop production has attracted many agricultural industries and contributed greatly to the economy of southern Alberta. Problems arising from regional variability and agricultural diversification have placed heavy demands on the Research Station.

In the broad field of agriculture the impact of the Lethbridge Station has been felt over much of western Canada. The Station is regularly confronted with problems of national scope. Specialized research is conducted on three substations, on irrigation and drainage at Vauxhall, on range management at Stavely, and on livestock and range management at Manyberries.

The Station maintains a close relationship with a sister institution, the Animal Diseases Research Institute, located six miles west of Lethbridge.

HISTORY

The ranchlands of southern Alberta faced a dramatic change at the turn of the century. The introduction of irrigation in 1901 and the ease with which rangeland could be converted to grain farming brought a vast influ of settlers into the area. With this new development many agricultural problems arose for which there was no immediate answer. In 1906 the Alberta Railroad and Irrigation Company donated 400 acres of mixed dry and irrigated land to the Government of Canada for the establishment of

Aerial view of St. Mary's Dam.

an experimental station to solve problems related to the agriculture of the time. During those settlement years there was need for information on sod-breaking, land preparation, and tillage practices for both dry and irrigated land. Kinds of crops and suitability of varieties were given early attention. Even as ranching gave way to farming the possibility of producing livestock feed on irrigated land to stabilize livestock production became apparent. Feeding trials in the early years of the Station paved the way for the feedlot industry to follow.

In the first twenty years of settlement the new country faced many problems. None was so severe as the soil drifting that left great mounds of rich top-soil piled along railroad rights-of-way and fence lines and still to be seen after fifty years.

Early work at the Station dealt with surface cultivation, strip farming, and trash cover to mitigate the effects of strong winds during dry periods. The thoroughness and success of this work were to serve western Canada well during the extreme drought of the 1930's.

During the 1930's successive dry years coupled with strong winds resulted in repeated crop failures and soil drifting became the number one problem of the prairies. In southern Alberta over a million acres of farmland were left abandoned and large areas of native grassland were overgrazed and depleted to a weedy, unproductive waste. The stabilization of drifting farmland and the revegetation of abandoned and overgrazed rangeland became an important phase of the work performed by the Experimental Station and supported by the Prairie Farm Rehabilitation Act in 1935.

Coincident with the problems of drought and soil drifting was the problem of insect control. Pale western cutworms removed new growth and left thousands of acres unprotected. Grasshopper outbreaks were frequent and severe. More spectacular was the explosive increase of the wheat stem sawfly. This insect, which had existed for centuries in the native grassland, lost its host when the prairies were plowed up but soon found a more acceptable host in wheat. With limited means of control western Canada's losses from the wheat stem sawfly reached a staggering twenty million bushels a year. This problem focused attention on the need of combining the efforts of scientists of different disciplines. Entomologists from Lethbridge worked with cereal breeders from the Swift Current Experimental Farm to produce the first sawfly-resistant wheat, Rescue. In 1947 the entomological laboratory was enlarged to become the Science Service Laboratory, which included plant pathologists and chemists. At the same time the cereal breeders were transferred from Swift Current to Lethbridge and work was immediately started on development of better quality sawfly-resistant wheats eventually to result in Chinook and later Cypress.

Other scientists were busy with forage crops. Chinook orchardgrass was developed for irrigated pastures. Beaver alfalfa, hardy enough for western Canada but resistant to bacterial wilt, was a product of the combined efforts of the Lethbridge and Saskatoon stations. At the Lethbridge Experimental Station, Canada's only wool research laboratory was established in 1946 and used in conjunction with the cooperative breeding program for the development of a breed of sheep suitable for western Canada. To cope with increasing problems of insect pests of livestock a Livestock Insect Section was added to the Science Service Laboratories in 1949. With irrigation expansion came problems of water-plant relationships, water movement, drainage, and alkali necessitating the establishment of an irrigation substation at Vauxhall.

The proper use of foothills rangeland came under investigation with the establishment of the Stavely substation in 1947.

In 1959 the Science Service Laboratory was amalgamated with the Experimental Station and the Lethbridge Research Station came into being with a total of 68 research scientists in nine disciplines since regrouped into six sections. In 1964 the administration and research direction of the Manyberries Experimental Farm, established in 1928, was transferred to the Lethbridge Research Station.

Aerial view of the Research Station buildings.

CURRENT RESEARCH

The present objectives of research at the Lethbridge Research Station are to develop varieties of crops and breeds of animals suited to the irrigated and dryland areas of southern Alberta and to improve the methods of crop and animal production. The research programs uniting the efforts of scientists of many disciplines are designed toward the fulfillment of these objectives.

THE ANIMAL SCIENCE SECTION conducts basic and applied research on nutrition, physiology, breeding, and management of beef and dairy cattle, sheep, and poultry. Nutritional research is directed to the requirements of dairy cattle, lamb weaning and finishing, laying hens, and broilers. Rations, based on currently available grains and forages, are formulated for various phases of beef production. Beef cattle breeding and crossbreeding of beef and dairy breeds for hybrid vigor and rapid growth rates are under investigation. Animal performance on range and seeded pasture is studied cooperatively with range and soil scientists at Lethbridge and the Livestock and Range Research Substation, Manyberries.

Dr. J. Freyman is studying early maturing hybrids which may open the way for grain corn production in southern Alberta.

THE CROP ENTOMOLOGY SECTION is involved in developing methods of managing the populations for more than 40 species of insects to protect crops or increase seed production. It forecasts outbreaks of grasshoppers and cut-worms and conducts research on pollution control, cold hardiness of insects, sex attractants, host plant resistance, and pollination of legume crops. Although the research is aimed at developing and improving insect controls, it involves a considerable amount of background information to develop such controls. This is obtained through a wide range of scientific specialties involving ecology, behavior, and chemistry. Cooperation with other sections is emphasized, particularly in the areas of plant breeding for insect resistance and the transmission of plant diseases.

THE PLANT PATHOLOGY SECTION conducts research on the protection of crops from disease pathogens. In cooperation with plant breeders, pathologists are engaged in protection of crops from losses caused by fungi, bacteria, nematodes, viruses, and physiologic damage. Crops may be protected by chemical treatments but the ultimate aim is the development of disease resistance within the plant. Projects are underway for the development of varieties resistant to stem nematode of alfalfa, wheat streak mosaic, root rot in wheat and barley, and snow mold in alfalfa and turfgrass.

THE PLANT SCIENCE SECTION develops varieties of cereals, forage crops, vegetables, and ornamentals by breeding and conducting related fundamental research in genetics and cytogenetics. Spring and winter wheat and malting and feed barleys are being developed for high yield, quality, and disease resistance. Alfalfa and sainfoin are being improved through breeding and various other legumes are under test. Individual forage species are evaluated for irrigated and dryland pasture. Range studies involve the utilization of native and reseeded grasslands for livestock production. Corn hybrids are being evaluated for grain and silage. Control, ecology, and physiology of land and water weeds are under investigation and fresh vegetable production is being studied.

THE SOIL SCIENCE SECTION conducts research to determine precise fertilizer needs of irrigated and dryland crops. Management systems are being sought that will improve the physical, chemical, and microbiological condition of the soil. Studies are being conducted to improve tillage and seeding methods, prevent erosion, conserve moisture, control weeds, and ensure uniform crop stands. Irrigation studies deal

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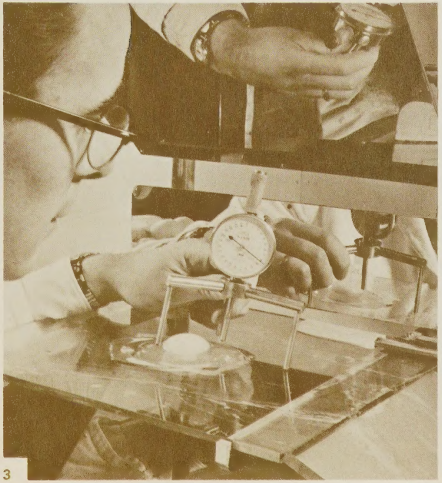

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1) Aquatic plant growth can be controlled by selective herbicides.

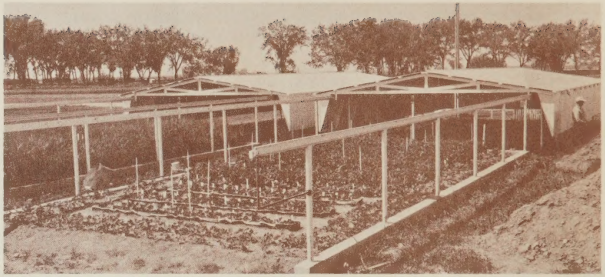
2) Braham X Hereford hybrid cows and their progeny in a lifetime productivity study.

3) Measurement of egg quality is essential in poultry breeding and nutrition research.

4) Wheat stem sawfly damage. Resistant varieties are constantly being improved.

with methods of more efficient use of water by crops and of preventing or correcting soil salinity. Pollution potential from animal wastes, commercial or municipal sewage, and commercial fertilizers is under investigation as are basic studies on soil organic matter, bio-magnetism, and salt movement in soils.

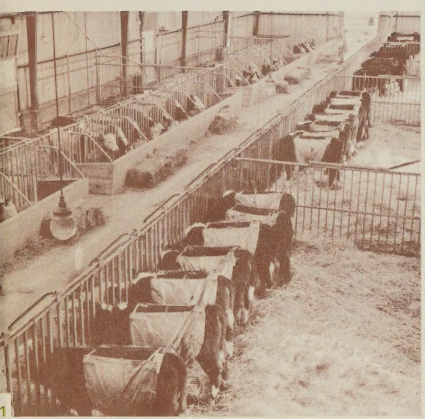
THE VETERINARY-MEDICAL ENTOMOLOGY SECTION is engaged in solving problems related to pests and parasites of man and animals and is particularly concerned with pest infestations and parasitic infections that cause economic losses in livestock production. Research projects deal with the ecology, behavior, pathology, and host-parasite relations of various biting flies, cattle grubs, lice, ticks, sheep keds, and other pests of livestock and their control. Biological and chemical means of protecting man and animals from pests are developed in a wide range of environments. Reaction of animals to pesticides and its effect on economic productivity are included in the studies.



A completely automatic rain shelter protects irrigation experiments from rain.

Dr. G. A. Hobbs (left) studying the use of leafcutter bees for alfalfa seed production.

Dr. E. J. Hawn studies the influence of parasitic nematodes on the development of disease organisms in alfalfa.



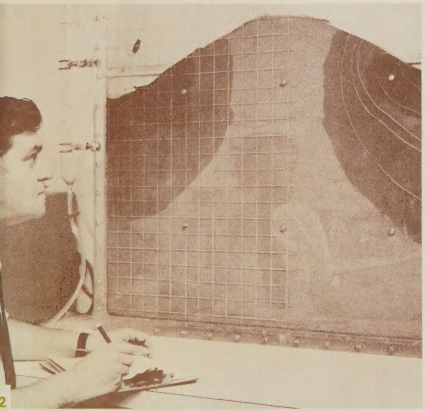
1) Warble-infested calves wearing "girdles" designed to capture mature grubs enabling entomologists to study the life cycle of the warble fly.

2) Dr. J. C. van Schaik using laboratory model for measuring movement of moisture and salts in soil.

3) Sampling populations of ectoparasites for development of control methods. Blood-sucking lice infestations can cause death of a host animal.

4) Sheep used in evaluating selections in a forage crop breeding program.

5) Snow mold control with fungicides in turf research.



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S. B. ARNASON, *B.S.A.*	Administrative Officer
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R. H. Robertson, *B.A., M.Sc.*	Serology
J. A. Shemanchuk, *B.Sc., M.Sc.*	Biting-fly ecology
J. Weintraub, *B.A., M.S.*	Physiology (reproduction)

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